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Food neophobia and its relationship with dietary quality and diversity in Turkish young adults: a cross-sectional study

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ABSTRACT

Food neophobia, the fear of trying new foods, may reduce dietary variety, posing risks for nutritional deficiencies. This study examined the links between food neophobia, dietary quality, and diversity among Turkish young adults. A cross-sectional study with 949 participants (470 males, 479 females) aged 18–35 years used the Food Neophobia Scale (FNS) and a 24-h dietary recall to assess food intake. Dietary diversity score (DDS), food variety score (FVS), mean adequacy ratio (MAR), and healthy eating index (HEI-2015) were calculated. The mean neophobia score was 37.07 ± 12.17, with 13.4% high, 67.9% average, and 18.8% low neophobia. The average neophobia group had higher diet quality scores (MAR, DDS, FVS) than the low and high neophobia groups ($p < 0.01$). Positive relationships with food neophobia were found for niacin, calcium, zinc, plant protein, and cholesterol ($p < 0.05$). These findings suggest that food neophobia may affect dietary quality variably, with certain micronutrients positively linked to it.

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Food neophobia; dietary variety; diet quality

Introduction

Food neophobia, as defined by Pliner and Hobden (1992), is characterized by the fear of consuming new or unfamiliar foods, which is marked by the tendency to reject them or experience anxiety and aversion, significantly influencing daily food choices (Pliner and Hobden 1992; Capiola and Raudenbush 2012). Previous studies have reported that the prevalence of food neophobia ranges from approximately 16% to 30% among adults worldwide, whereas among young adults, it ranges from 13% to 22% (Olabi et al. 2009; Jaeger et al. 2017; Sarin et al. 2019; Predieri et al. 2020; Jezewska-Zychowicz et al. 2021; Tian and Chen 2021).

Food neophobia is a complex behaviour that varies in intensity throughout life and typically peaks in early childhood. It stabilizes during adulthood and gradually increases with advancing age (Pliner and Salvy 2006; Dovey et al. 2008). Food neophobia differs from other eating behaviours, such as picky eating, in that it specifically involves a reluctance to try new foods, whereas picky eating includes rejecting both new and familiar foods, often limiting the individual to only a few favourite foods, and typically emerges during this period (Dovey et al. 2008).

Young adults aged 18 to 35 are in a crucial developmental stage where food preferences and behaviours, including food neophobia, are influenced by factors such as increased independence, peer pressure, and lifestyle changes (Giordano et al. 2018). They are particularly vulnerable to poor

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dietary habits, such as late-night snacking, skipping meals, and irregular eating patterns, which can exacerbate these issues (Faris et al. 2022). Furthermore, food neophobia during young adulthood can contribute to unhealthy eating habits, nutritional imbalances, and eating disorders, potentially leading to weight gain (Deliens et al. 2014; Banna et al. 2022; Sahrin et al. 2023). Therefore, assessing food neophobia in young adults becomes of significant importance.

This aversion to new foods restricts dietary variety, which in turn limits overall dietary diversity (Knaapila et al. 2011; Quick et al. 2014). Higher levels of food neophobia in both adults and young adults are associated with reduced intake of diverse food groups, including vegetables, fruits, fish, and protein, while also leading to increased consumption of unhealthy foods, including excessive fat, sugar, and salt (Knaapila et al. 2011, 2015; Jaeger et al. 2017; Costa et al. 2020; Hazley et al. 2022). As a result, individuals with high food neophobia tend to have a lower intake of nutrients such as omega-3 fatty acids, protein, vitamin C, magnesium, and thiamine (Zalilah et al. 2005; Kozioł-Kozakowska et al. 2018; Sarin et al. 2019; Hazley et al. 2022).

While food neophobia is generally linked to poorer overall dietary quality in adults, research on this relationship has produced varying results, highlighting the need for further investigation (Siegrist et al. 2013; Knaapila et al. 2015; Sarin et al. 2019). Few studies have specifically examined the impact of food neophobia on overall diet quality in adults (Knaapila et al. 2015; Sarin et al. 2019; Costa et al. 2020; Predieri et al. 2020; Hazley et al. 2022). For example, in Finnish adults, higher food neophobia scores were associated with lower diet quality, as assessed by the Index of Diet Quality (Knaapila et al. 2015). Similarly, another study reported a link between food neophobia and reduced dietary quality via the Baltic Sea Diet Score (Sahrin et al. 2023). In Italian adults, an increase in food neophobia corresponded with a decrease in the Italian Taste Mediterranean Index (ITMI), which is linked to diet quality (Predieri et al. 2020). However, studies in Ireland and Portugal-one using the mean adequacy ratio (MAR) and nutrient-rich food index (NRF9.3) and the other using the healthy diet indicator – did not find significant relationships with overall diet quality (Costa et al. 2020; Hazley et al. 2022).

Understanding the impact of food neophobia on dietary patterns is crucial for developing public health initiatives that promote healthier food choices (Jaeger et al. 2017; Hazley et al. 2022). This study aims to investigate the associations among food neophobia, dietary quality, and dietary diversity in young adults in Turkey. We hypothesize that higher levels of food neophobia are associated with lower dietary variety and quality, leading to deficiencies in macro- and micronutrients among this population.

Materials and methods

Study design and sample

This cross-sectional study involved 949 young adults (470 males, 479 females) aged between 18 and 35 years. The survey was conducted by the researchers in Ankara, the capital of Turkey, using the face-to-face interview technique. The inclusion criterion was that participants had to be healthy individuals aged 18–35 years who consented to participate. The exclusion criteria included severe illnesses (such as cancer, myocardial infarction, or stroke), the use of vitamin-mineral supplements or fortified foods in last 6 months, and pregnancy or lactation. The use of fortified foods and supplements was excluded regardless of the specific day on which food consumption was assessed. A full ethical review was performed, and informed written consent was obtained from all participants included in the study. The study was approved by the Gazi University Ethics Committee (protocol number 4 October 2022). The participants completed questionnaires regarding their sociodemographic characteristics (age, sex, marital status, education level, and physical activity), food neophobia, and eating habits. The study was conducted by dietitians, who were responsible for both data collection (including all surveys and food records) and data analysis. Height and body weight data were collected through self-report, where participants were asked to provide their own

measurements. It has been stated that the body mass index (BMI) calculated from self-reported data can be used as a valid measure (Hodge et al. 2020). The BMI of the participants was calculated with the equation "body weight/height^2 (kg/m^2)". The obtained BMI values were classified based on the WHO classification; 18.5–24.9 kg/m^2 as normal weight, 25.0–29.9 kg/m^2 as overweight, and ≥30 kg/m^2 as obese (World Health Organization 2000).

Measures

Food Neophobia Scale (FNS)

Food neophobia levels were assessed with the Food Neophobia Scale (FNS) (Pliner and Hobden 1992) which was validated in Turkish by Uçar et al. (2021). The Cronbach's alpha coefficient of the FNS scale was found to be 0.805 (Uçar et al. 2021). The participants were instructed to evaluate the 10 items on the scale via a seven-point rating system ranging from strongly disagree (1) to strongly agree (7). The Food Neophobia Scale consists of five positive items (indicating a neophilic attitude) and five negative items (indicating a neophobic attitude). Before data analysis, the scores for the negative items were reversed. Individual food neophobia scores were computed by summing the scores for each item, resulting in a range from 10 to 70. A higher score indicates a greater aversion to trying new foods (Pliner and Hobden 1992). The total food neophobia scale score was classified into three groups: low (defined as a food neophobia scale score less than the mean value minus one standard deviation [SD]), average (defined as a food neophobia scale score falling between the mean value minus one SD and the mean value plus one SD), and high (defined as a food neophobia scale score greater than the mean value plus one SD). According to the mean and standard deviation values from a previous study, food neophobia scale scores of ≤25 points were classified as low, 26–48 points as average, and ≥49 points as high (Zysk et al. 2019).

Nutrient intake

Food consumption was assessed via a 24-h dietary recall method conducted by trained dietitians. Portion sizes of consumed foods were documented via household measurements, standardized weights for food items, and photographic representations of servings. The dietary analysis software BEBIS 8.1, which utilizes the Turkish Food Composition Database, was employed to evaluate daily energy intake as well as the levels of macro- and micronutrients in the diet.

Healthy Eating Index–2015

The Healthy Eating Index–2015 (HEI–2015), adapted according to the Turkish Dietary Guidelines (Turkey Dietary Guidelines (TÜBER) 2022), was utilized. The HEI-2015 comprises 13 components that evaluate the sufficiency and moderation of food groups and nutrients, providing a 100-point measure of dietary quality. An HEI score of 80 or higher indicates a favourable diet, whereas scores between 50 and 80 suggest that there is room for dietary improvement. A score of less than 50 indicates a poor diet (Guenther et al. 2008).

Mean adequacy ratio (MAR)

The mean adequacy ratio (MAR), which assesses the overall sufficiency of daily food intake according to nutritional recommendations, was calculated by summing the nutrient adequacy ratios (NARs) of all evaluated nutrients.

To calculate the nutrient adequacy ratio for 17 micronutrients – specifically, vitamins A, B6, B12, C, and E; niacin; thiamine; riboflavin; pantothenate; biotin; folate; calcium; iron; magnesium; zinc; phosphorus; and potassium – the intake of each micronutrient was divided by the dietary reference

intake appropriate for each subject's sex and age, as specified by the Turkey Dietary Guidelines (Turkey Dietary Guidelines (TÜBER) 2022), and expressed as a percentage.

All NARs with values greater than one were capped at one to avoid compensating for deficiencies that may exist in some nutrients. Therefore, the maximum value for NARs is limited to one. The reference value for the MAR is also set at one, which corresponds to 100% of the recommended dietary allowance (RDA) and signifies ideal dietary adequacy in line with the recommendations (Hatløy et al. 1998).

The dietary diversity score (DDS)

The dietary diversity score determined by Hatloy (Hatløy et al. 1998) was used in the assessment of dietary diversity. According to this method, the number of different food groups consumed by a person in a 24-h period was identified. The food groups include (1) cereals, roots, and tubers; (2) vitamin A-rich fruits and vegetables; (3) other fruits; (4) other vegetables; (5) legumes and nuts; (6) meat, poultry, and fish; (7) fats and oils; (8) dairy; and (9) eggs. Each food group received a score of "1" if the person consumed at least one item from that specific group during the reference period; otherwise, a score of "0" was assigned. The consumption of food groups in ≤3 groups represented low variety, the consumption in 4–5 groups represented moderate variety, and the consumption in ≥6 groups represented high variety. In this study, DDS scores ranged from 2 to 9.

The food variety score (FVS)

The food variety score determined by Hatloy (Hatløy et al. 1998) was utilized to assess dietary variety. The FVS is defined as the number of food items consumed within a 24-h period. Each food group received a score of "1" if the individual consumed at least one item from that specific group during the reference period; otherwise, a score of "0" was assigned. In this study, the FVS values ranged from 2 to 24.

Statistical analysis

The data collected were statistically analysed via the SPSS 22.0 software package. Continuous data are presented as the means and standard deviations, whereas categorical variables are presented as counts (n) and percentages (%). Student's t test or one-way ANOVA was used to compare continuous variables, followed by the least significant difference (LSD) test for multiple comparisons. The Kruskal–Wallis test was employed for nonparametric data, with the Mann–Whitney U test used as a post hoc test for multiple comparisons. Additionally, the chi-square test was used to compare the constituent ratios of each group. The correlation between two independent variables was analysed via the Pearson correlation coefficient. A multivariate general linear model was employed to calculate parameter estimates (beta coefficients and 95% confidence intervals) to investigate the associations between food neophobia scale scores and all dietary measures. All analyses revealed statistical significance at a p value of less than 0.05.

Results

The sociodemographic characteristics of the Turkish young adults included in the Food Neophobia Scale are presented in Table 1. The study sample comprised 949 adults, 50.5% of whom were female. Approximately 80.4% of the sample were university students, and 83.5% were single. The mean food neophobia level among the participants was 37.07 ± 12.17. Among the participants, 13.4% were classified as having high food neophobia, 67.9% as having average food neophobia, and 18.8% as having low food neophobia. The food neophobia scale scores of single individuals were lower than those of married individuals ($p < 0.05$).

Table 1. Sociodemographic characteristics of the Turkish young adults on the basis of FNS scores ($n = 949$).

		Food neophobia scale score			
Variables	Total Sample	Low ($n = 178$)	Average ($n = 644$)	High ($n = 127$)	p value
Sex					
Female	479 (50.5)	85 (47.8)	326 (50.6)	68 (53.5)	0.399[a]
Male	470 (49.5)	93 (52.2)	318 (49.4)	59 (46.5)	
Age					
<20	76 (8.0)	9 (5.1)	59 (9.2)	8 (6.3)	0.057[a]
20–24	604 (63.6)	139 (78.1)	369 (57.3)	96 (75.6)	
25–35	269 (28.3)	30 (16.9)	216 (33.5)	23 (18.1)	
Age (mean ± SD)	23.81 ± 4.14	22.8 ± 3.06[df*]	24.2 ± 4.39	23.1 ± 3.88	0.001[c]
Education level					
<University degree	151 (15.9)	9 (5.1)	126 (19.6)	16 (12.6)	0.001[a]
University student	763 (80.4)	162 (91.0)	495 (76.9)	106 (83.5)	
>University degree	35 (3.7)	7 (3.9)	23 (3.6)	5 (3.9)	
Martial statues					
Single	792 (83.5)	171 (96.1)	510 (79.2)	111 (87.4)	0.001[a]
Married	157 (16.5)	7 (3.9)	134 (20.8)	16 (12.6)	
BMI (kg/m^2)					
<18.5	109 (11.5)	34 (19.1)	58 (9.0)	17 (13.4)	0.072[a]
18.5–24.9	547 (57.6)	96 (53.9)	370 (57.5)	81 (63.8)	
25.0–29.9	230 (24.2)	44 (24.7)	161 (25.0)	25 (19.7)	
≥30	63 (6.6)	4 (2.2)	55 (8.5)	4 (3.1)	
BMI (kg/m^2) (mean ± SD)	23.27 ± 4.22	22.4 ± 3.96[d*]	23.7 ± 4.30	22.6 ± 3.96	0.001[b]

The data are presented as the n % (chi-square test) and mean ± SD (ANOVA test, Kruskal–Wallis t test), denoted by a, b, and c, respectively.

*d, e, f Post hoc analysis between low FNS and average FNS, low FNS and high FNS, average FNS and high FNS, respectively. *$p < 0.05$, **$p < 0.001$.*

The diet scores of Turkish young adults, categorized by food neophobia scale scores, are presented in Table 2. Among the indicators of dietary adequacy, participants classified as having high food neophobia presented significantly higher scores for the dairy component than did those in the average food neophobia group ($p < 0.05$). Additionally, the fatty acid content in the average food neophobia group was greater than that in both the low- and high-food neophobia groups ($p < 0.05$).

With respect to dietary moderation, participants categorized as having low food neophobia had higher scores for sodium and saturated fats than did those in the average food neophobia group ($p < 0.05$). The high food neophobia group demonstrated significantly lower consumption of vegetables than both the low and average food neophobia groups did (204.33 ± 499.32, 249.40 ± 194.60, and 254.75 ± 499.32, respectively), with a significant difference observed only between the high and average food neophobia groups ($p < 0.05$).

Furthermore, the average food neophobia group presented significantly higher diet quality scores – including MAR, DDS, and FVS – than both the low and high food neophobia groups did ($p < 0.01$ for all). However, no significant differences were found in the HEI-2015 scores among the low, average, and high food neophobia groups ($p > 0.05$).

The results of the multiple regression analysis examining the relationships between macronutrients, micronutrients, and food neophobia are presented in Table 3. The model used to assess these relationships was statistically significant ($F = 1.916$, $p < 0.001$), with an explanatory rate of 3% for food neophobia (Adj. $R^2 = 0.037$). Significant positive relationships with food neophobia were observed for niacin ($\beta = 0.434$, $p < 0.001$), calcium ($\beta = 0.007$, $p = 0.019$), zinc ($\beta = 0.656$, $p = 0.003$), plant protein ($\beta = 0.141$, $p = 0.021$), and cholesterol ($\beta = 0.009$, $p = 0.015$). These findings show that higher levels of food neophobia may be linked to increased cholesterol and plant protein consumption, as well as higher niacin and zinc intake. No association was identified between food neophobia and the other macro- and micronutrients examined.

Table 2. Diet scores of Turkish young adults based on FNS scores.

	Food neophobia scale score			p value
Dietary Intake	Low ($n = 178$)	Average ($n = 644$)	High ($n = 127$)	
Adequacy				
Total fruit (includes fruit juice)	2.10 ± 2.01	2.06 ± 1.89	1.96 ± 1.99	0.806[a]
Whole fruit (all fruit forms except juice)	2.72 ± 2.29	2.80 ± 2.21	2.49 ± 2.29	0.355[a]
Total Vegetables	2.27 ± 1.76	2.42 ± 1.58	2.18 ± 1.61	0.226[a]
Greens and Beans	3.03 ± 1.97	3.07 ± 1.89	3.24 ± 1.94	0.616[a]
Whole Grains	0.73 ± 2.23	0.55 ± 2.00	0.75 ± 2.52	0.628[b]
Dairy	3.66 ± 2.85	3.33 ± 2.62[f*]	4.17 ± 3.05	0.005[a]
Total Protein Foods	4.12 ± 1.46	4.35 ± 1.23	4.21 ± 1.36	0.086[a]
Seafood and Plant Proteins	2.00 ± 2.22	1.73 ± 2.18	2.06 ± 2.30	0.151[a]
Fatty Acids	4.28 ± 3.77[d*]	6.24 ± 3.29[f*]	4.78 ± 3.60	0.001[a]
Moderation				
Refined Grains	5.63 ± 3.25	5.20 ± 3.06[f*]	6.01 ± 2.81	0.012[a]
Sodium	4.67 ± 3.95[d*]	3.85 ± 3.87[f*]	4.87 ± 3.87	0.004[a]
Added Sugars	7.87 ± 2.94	8.26 ± 2.79	8.29 ± 2.83	0.250[a]
Saturated Fats	3.74 ± 3.35[d**]	5.28 ± 3.37	4.49 ± 3.57	0.001[a]
Healthy Eating Index 2015	46.9 ± 12.63	49.2 ± 13.65	49.6 ± 13.62	0.106[a]
Diet quality				
Mar	0.76 ± 0.18[d*]	0.80 ± 0.15[f*]	0.75 ± 0.17	0.001[a]
Dietary diversity score (DDS)	7.0 ± 1.39[d*]	7.3 ± 1.24[f*]	7.0 ± 1.33	0.001[a]
Food variety score (FVS)	12.4 ± 3.63[d*]	13.2 ± 3.13[f*]	12.4 ± 3.12	0.001[a]

*The data are presented as the means ± SDs (ANOVA and Kruskal–Wallis t test), denoted by a and b, respectively. d, e, f Post hoc analysis between low FNS and average FNS, low FNS and high FNS, average FNS and high FNS, respectively. *$p < 0.05$, **$p < 0.001$.*

Discussion

In this cross-sectional study, we investigated the associations among food neophobia, dietary quality, and diversity among young adults in Turkey. The results of this study suggest that the average food neophobia scale group presented significantly higher diet quality scores, including for the MAR, DDS, and FVS, than did the low food neophobia scale and high food neophobia scale groups. However, the HEI scores did not differ between the low food neophobia scale, average food neophobia scale, and high food neophobia scale groups.

Studies conducted on various populations have shown consistent results regarding food neophobia scores (Costa et al. 2020; Sahrin et al. 2023). In our study, the participants presented a food neophobia scale score of 37.07 ± 12.17, indicating an average level of food neophobia. This finding aligns with similar studies conducted among Portuguese adults (37.5 ± 11.2) (Costa et al. 2020) and Bangladeshi young adults (37.45 ± 13.39) (Sahrin et al. 2023). However, the mean food neophobia scale score was slightly higher among Polish adults (38.9 ± 8.1) (Jezewska-Zychowicz et al. 2021) and Turkish university students (39.41 ± 9.23) (Basaran and Ozbek 2023). In contrast, other studies reported lower food neophobia scale scores, such as 36.27 among Chinese university students (Tian and Chen 2021) and 32 ± 13.1 among Irish adults aged 18–35 years (Hazley et al. 2022).

In our study, 13.4% of the participants exhibited neophobic tendencies, with 67.9% classified as having average food neophobia and 18.8% as having low food neophobia. In studies conducted in Turkey, Çakır et al. (2023) reported a food neophobia rate of 24.2% among adults aged 20–64, while Basaran and Ozbek (2023) found this rate to be 14.6% among university students. In contrast, Jezewska-Zychowicz et al. (2021) reported that only 5.2% of Polish young adults aged 18–30 years were food neophobic, while 71.0% had an average food neophobia scale score, and 23.8% had low food neophobia. The differing prevalence rates of food neophobia suggest potential variations influenced by cultural or demographic factors. Interestingly, the similarity in mean food neophobia scale scores across adult studies indicates a resemblance in food neophobia tendencies despite regional differences.

Table 3. Dietary intake and FNS scores of Turkish young adults.

	Mean (SS)	B (95% CI)	p value
FNS score	37.07 (12.18)	67.258 (−43.389; 177.906)	.233
Macronutrients			
Energy (kcal/day)	1862.73 (776.51)	−.016 (−.078; .046)	.606
Protein (g)	69.49 (32.66)	−.133 (−.411; .145)	.347
Protein (% E)	15.50 (4.36)	−.432 (−1.589; .724)	.463
Total fat (g)	83.58 (40.98)	.052 (−.530; .635)	.860
Total fat (% E)	39.62 (8.66)	−.329 (−1.446; .788)	.563
Carbohydrate (g)	203.24 (100.09)	.071 (−.184; .326)	.583
Carbohydrate (%E)	44.78 (9.41)	−.258 (−1.374; .857)	.650
Saturated fat	29.30 (15.11)	−.034 (−.469; .402)	.880
Mufa	28.84 (15.75)	.147 (−.268; .563)	.486
Pufa	18.63 (12.36)	−.461 (−1.656; .735)	.450
Cholesterol	334.32 (226.09)	.009 (.002; .017)	.015*
Omega3	1.81 (1.68)	1.556 (−.121; 3.234)	.069
Omega6	16.27 (11.13)	.398 (−.754; 1.551)	.498
Omega6/omega3	12.19 (9.75)	.066 (−.065; .198)	.321
Fibre (soluble)	6.43 (3.67)	.329 (−.382; 1.040)	.364
Fibre (unsoluble)	12.65 (8.70)	−.111 (−.671; .449)	.698
Fibre	19.71 (12.34)	−.076 (−.601; .450)	.777
Plant protein	33.70 (17.70)	.141 (.021; .260)	.021*
Micronutrients			
Vitamin A (µg)	1079.85 (2707.88)	−.002 (−.010; .006)	.660
Vitamin E (mg)	17.68 (11.97)	.113 (−.073; .299)	.234
Vitamin C (mg)	97.16 (92.31)	.004 (−.013; .021)	.635
Vitamin K	93.97 (152.12)	−.008 (−.015; .001)	.050
Tiamin (mg)	.90 (.51)	−.602 (−6.646; 5.441)	.845
Riboflavin (mg)	1.34 (.76)	2.604 (−2.105; 7.313)	.278
Niacin (mg)	24.84 (17.57)	.428 (.290; .565)	<.001**
Pantothenate (mg)	5.20 (3.40)	−.083 (−1.024; .857)	.862
Vitamin B6 (mg)	1.37 (.78)	−1.091 (−4.252; 2.069)	.498
Biotin (µg)	47.43 (33.18)	−.080 (−.163; .003)	.059
Folate (µg)	284.08 (178.67)	−.001 (−.012; .010)	.802
Vitamin B12 (µg)	4.51 (6.04)	−.121 (−.368; .127)	.338
Retinol	597.34 (2656.09)	.002 (−.006; .010)	.601
Caroten	2.88 (3.87)	.256 (−1.108; 1.620)	.713
Sodium	1588.64 (1083.17)	.001 (−.001; .001)	.783
Potassium	2407.44 (1203.22)	.001 (−.002; .002)	.913
Calcium	614.37 (314.88)	.007 (.001; .013)	.019*
Magnesium	261.19 (152.22)	.015 (−.012; .041)	.285
Phosphorus	1087.17 (524.65)	−.007 (−.019; .005)	.233
Iron	10.33 (5.85)	−.344 (−.868; .180)	.198
Zinc	9.62 (5.24)	.656 (.227; 1.085)	.003*
Copper	1.49 (1.00)	−1.203 (−4.189; 1.784)	.429

*The data are presented as the means ± SDs (multivariate linear model), *p < 0.05, **p < 0.001.*

The relationships between sociodemographic factors and food neophobia were examined in this study, which is consistent with several recent studies in the literature (Costa et al. 2020; Jezewska-Zychowicz et al. 2021; Hazley et al. 2022; Sahrin et al. 2023). Previous research has reported associations between food neophobia and individual factors such as sex, age, education level, and BMI (Gere et al. 2017; Predieri et al. 2020; Sahrin et al. 2023). In our study, participants with higher education levels and those who were married presented lower levels of food neophobia.

While some studies indicate that sex is an important determinant of food neophobia and food preferences (Manippa et al. 2017; Bärebring et al. 2020; Sahrin et al. 2023), our findings reveal no significant differences in attitudes toward food neophobia between the sexes. This aligns with previous studies conducted across diverse cultural contexts, including Ireland, Portugal, Poland, South Korea, and New Zealand (Jaeger et al. 2017; Costa et al. 2020; Jezewska-Zychowicz et al. 2021; Zhao et al. 2021; Hazley et al. 2022; Kim and Kim 2024). The differences in findings could also be attributed to sociocultural aspects present in each study setting.

Some studies have shown that food neophobia in adults restricts dietary diversity (Jaeger et al. 2017; Hazley et al. 2022) and reduces diet quality (Rabadán and Bernabéu 2021). Our results align with the literature, indicating that food neophobia limits both dietary diversity and diet quality. Notably, participants with both high and low food neophobia scores were found to restrict the variety and quality of their diets.

Previous research has also highlighted a tendency among neophobic individuals to avoid vegetables (Jaeger et al. 2017; Costa et al. 2020; Hazley et al. 2022; Kim and Kim 2024). Our study partially supports these findings, demonstrating lower vegetable consumption among participants exhibiting neophobic tendencies.

Indirect evidence from studies suggests that greater food neophobia is negatively associated with the consumption of many recommended foods, including fruits, vegetables, fish, and whole-grain bread (Jaeger et al. 2017; Predieri et al. 2020). However, our study did not find an association between food neophobia scores and the consumption of specific food groups. Interestingly, participants in the average food neophobia scale group reported greater intake of fatty acids, aligning with recommendations for a balanced diet. In contrast, the high food neophobia scale group presented increased consumption of sodium and refined grains, whereas the low food neophobia scale group presented elevated intake of sodium and saturated fats, indicating potential deviations from optimal dietary patterns.

While studies have suggested that food neophobia decreases dietary variety, few studies have investigated its impact on micronutrient intake (Capiola and Raudenbush 2012; Hazley et al. 2022). In our study, of the 22 micronutrients assessed, only niacin, calcium, zinc, plant protein, and cholesterol intake were positively associated with food neophobia. This contrasts with previous studies that reported negative associations with the intake of vitamin C and magnesium (Capiola and Raudenbush 2012; Hazley et al. 2022), as well as overall energy intake (Capiola and Raudenbush 2012), among the 18–19 nutrients studied.

This study is subject to several limitations that should be taken into account when interpreting the results. The cross-sectional design of the study restricts the ability to establish causal relationships between food neophobia and dietary quality. To better understand the directionality and long-term effects of food neophobia on dietary habits, longitudinal studies would be necessary. The use of the 24-h dietary recall method to assess food intake relies on participants' memory, which could introduce recall bias or inaccuracies in reporting. Furthermore, the study's reliance on self-reported data may be influenced by social desirability bias, particularly in relation to healthy eating behaviours. Factors such as income, educational level, marital status, and the consumption of meals at the university's cafeteria could influence food choices. These aspects were not specifically investigated in the current study, which should be considered a limitation. Despite these limitations, the findings of this study provide valuable insights into the relationship between food neophobia and dietary quality among Turkish young adults. Future studies addressing these limitations could offer more robust evidence and a deeper understanding of the long-term effects of food neophobia on dietary diversity and quality.

Conclusion

In conclusion, this cross-sectional study indicates that young adults in Turkey with average food neophobia scores generally exhibit better dietary quality and diversity than those with low or high food neophobia. However, the study also demonstrated that food neophobia does not significantly affect the consumption of specific food groups or overall HEI-2015 scores. These findings suggest that while food neophobia can limit dietary variety and quality, its impact on nutrient intake may differ, with certain micronutrients showing positive associations with food neophobia. Further research is necessary to explore the complex relationship between food neophobia and dietary patterns across diverse populations.

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References

Banna MHA, Brazendale K, Hasan M, Khan MSI, Sayeed A, Kundu S. 2022. Factors associated with overweight and obesity among Bangladeshi university students: a case–control study. J Am Coll Health. 70(8):2327–2333. doi: 10.1080/07448481.2020.1851695.

Bärebring L, Palmqvist M, Winkvist A, Augustin H. 2020. Gender differences in perceived food healthiness and food avoidance in a Swedish population-based survey: a cross sectional study. Nutr J. 19(1):1–8. doi: 10.1186/s12937-020-00659-0.

Basaran AG, Ozbek YD. 2023. A study of the relationship between university students' food neophobia and their tendencies towards orthorexia nervosa. Behav Sci (Basel). 13(12):958. doi: 10.3390/bs13120958.

Çakır B, Durmaz SE, Kılınç FN, Özenir Ç, Gümüş AB. 2023. The relationship between food neophobia and dietary habits in Turkish adults: a cross-sectional study. Artuklu Int J Health Sci. 3(1):10–17. doi: 10.58252/artukluder.1240393.

Capiola A, Raudenbush B. 2012. The effects of food neophobia and food neophilia on diet and metabolic processing. Food Nutr Sci. 3(10):1397–1403. doi: 10.4236/fns.2012.310183.

Costa A, Silva C, Oliveira A. 2020. Food neophobia and its association with food preferences and dietary intake of adults. Nutr Diet. 77(5):542–549. doi: 10.1111/1747-0080.12587.

Deliens T, Clarys P, De Bourdeaudhuij I, Deforche B. 2014. Determinants of eating behaviour in university students: a qualitative study using focus group discussions. BMC Public Health. 14(1):53. doi: 10.1186/1471-2458-14-53.

Dovey TM, Staples PA, Gibson EL, Halford JC. 2008. Food neophobia and 'picky/fussy'eating in children: a review. Appetite. 50(2–3):181–193. doi: 10.1016/j.appet.2007.09.009.

Faris ME, Vitiello MV, Abdelrahim DN, Cheikh Ismail L, Jahrami HA, Khaleel S, Khan MS, Shakir AZ, Yusuf AM, Masaad AA, Bahammam AS. 2022. Eating habits are associated with subjective sleep quality outcomes among university students: findings of a cross-sectional study. Sleep Breathing. 26(3):1365–1376. doi: 10.1007/s11325-021-02506-w.

Gere A, Székely G, Kovács S, Kókai Z, Sipos L. 2017. Readiness to adopt insects in Hungary: a case study. Food Qual Prefer. 59:81–86. doi: 10.1016/j.foodqual.2017.02.005.

Giordano S, Clodoveo ML, De Gennaro B, Corbo F. 2018. Factors determining neophobia and neophilia with regard to new technologies applied to the food sector: a systematic review. Int J Gastron Food Sci. 11:1–19. doi: 10.1016/j.ijgfs.2017.10.001.

Guenther PM, Reedy J, Krebs-Smith SM, Reeve BB. 2008. Evaluation of the healthy eating index-2005. J Am Diet Assoc. 108(11):1854–1864. doi: 10.1016/j.jada.2008.08.011.

Hatløy A, Torheim LE, Oshaug A. 1998. Food variety—a good indicator of nutritional adequacy of the diet? A case study from an urban area in Mali, West Africa. Eur J Clin Nutr. 52(12):891–898. doi: 10.1038/sj.ejcn.1600662.

Hazley D, McCarthy SN, Stack M, Walton J, McNulty BA, Flynn A, Kearney JM. 2022. Food neophobia and its relationship with dietary variety and quality in Irish adults: findings from a national cross-sectional study. Appetite. 169:105859. doi: 10.1016/j.appet.2021.105859.

Hodge JM, Shah R, Ml M, Gapstur SM, Patel AV. 2020. Validation of self-reported height and weight in a large, nationwide cohort of U.S. adults. PLOS ONE. 15(4):e0231229. doi: 10.1371/journal.pone.0231229.

Jaeger S, Rasmussen MA, Prescott J. 2017. Relationships between food neophobia and food intake and preferences: findings from a sample of New Zealand adults. Appetite. 116:410–422. doi: 10.1016/j.appet.2017.05.030.

Jezewska-Zychowicz M, Plichta M, Drywień ME, Hamulka J. 2021. Food neophobia among adults: differences in dietary patterns, food choice motives, and food labels reading in poles. Nutrients. 13(5):1590. doi: 10.3390/nu13051590.

Kim SY, Kim M. 2024. Food neophobia amongst young Korean adults in their 20s: its association with preference, acceptance, and perceived intake of fruits and vegetables. Int J Gastron Food Sci. 35:100875. doi: 10.1016/j.ijgfs.2024.100875.

Knaapila AJ, Sandell MA, Vaarno J, Hoppu U, Puolimatka T, Kaljonen A, Lagström H. 2015. Food neophobia associates with lower dietary quality and higher BMI in Finnish adults. Public Health Nutr. 18(12):2161–2171. doi: 10.1017/S1368980014003024.

Knaapila A, Silventoinen K, Broms U, Rose RJ, Perola M, Kaprio J, Tuorila HM. 2011. Food neophobia in young adults: genetic architecture and relation to personality, pleasantness and use frequency of foods, and body mass index—a twin study. Behav Genet. 41(4):512–521. doi: 10.1007/s10519-010-9403-8.

Kozioł-Kozakowska A, Piórecka B, Schlegel-Zawadzka M. 2018. Prevalence of food neophobia in preschool children from southern Poland and its association with eating habits, dietary intake and anthropometric parameters: a cross-sectional study. Public Health Nutr. 21(6):1106–1114. doi: 10.1017/S1368980014003024.

Manippa V, Padulo C, Van der Laan LN, Brancucci A. 2017. Gender differences in food choice: effects of superior temporal sulcus stimulation. Front Hum Neurosci. 11:597. doi: 10.3389/fnhum.2017.00597.

Olabi A, Najm NEO, Baghdadi OK, Morton JM. 2009. Food neophobia levels of Lebanese and American college students. Food Qual Prefer. 20(5):353–362. doi: 10.1016/j.foodqual.2009.01.005.

Pliner P, Hobden K. 1992. Development of a scale to measure the trait of food neophobia in humans. Appetite. 19(2):105–120. doi: 10.1016/0195-6663(92)90014-W.

Pliner P, Salvy SJ. 2006. Food neophobia in humans. In: Shepherd R, Raats M, editors. The psychology of food choice. Wallingford, (UK): Cabi; p. 75–92.

Predieri S, Sinesio F, Monteleone E, Spinelli S, Cianciabella M, Daniele GM, Dinnella C, Gasperi F, Endrizzi I, Torri L, et al. 2020. Gender, age, geographical area, food neophobia and their relationships with the adherence to the Mediterranean diet: new insights from a large population cross-sectional study. Nutrients. 12(6):1778. doi: 10.3390/nu12061778.

Quick V, Lipsky LM, Laffel LMB, Mehta SN, Quinn H, Nansel TR. 2014. Relationships of neophobia and pickiness with dietary variety, dietary quality and diabetes management adherence in youth with type 1 diabetes. Eur J Clin Nutr. 68(1):131–136. doi: 10.1038/ejcn.2013.239.

Rabadán A, Bernabéu R. 2021. A systematic review of studies using the food neophobia scale: conclusions from thirty years of studies. Food Qual Prefer. 93:104241. doi: 10.1016/j.foodqual.2021.104241.

Sahrin S, Al Banna MH, Rifat MA, Tetteh JK, Ara T, Hamiduzzaman M, Spence C, Kundu S, Abid MT, Mehedi Hasan MM, Akter N, Biswas A, Jharna DE. 2023. Food neophobia and its association with sociodemographic factors and food preferences among Bangladeshi university students: evidence from a cross-sectional study. Heliyon. 9(5):e15831. doi: 10.1016/j.heliyon.2023.e15831.

Sarin HV, Taba N, Fischer K, Esko T, Kanerva N, Moilanen L, Saltevo J, Joensuu A, Borodulin K, Männistö S, Kristiansson K, Perola M. 2019. Food neophobia associates with poorer dietary quality, metabolic risk factors, and increased disease outcome risk in population-based cohorts in a metabolomics study. Am J Clin Nutr. 110(1):233–245. doi: 10.1093/ajcn/nqz100.

Siegrist M, Hartmann C, Keller C. 2013. Antecedents of food neophobia and its association with eating behavior and food choices. Food Qual Prefer. 30(2):293–298. doi: 10.1016/j.foodqual.2013.06.013.

Tian H, Chen J. 2021. Food neophobia and intervention of university students in China. Food Sci Nutr. 9(11):6224–6231. doi: 10.1002/fsn3.2575.

Turkey Dietary Guidelines (TÜBER). 2022. Pekcan G, Şanlıer N, Baş M, Acar Tek N, Gökmen Özel H, editors. Ministry of health, general directorate of public health. In: Ministry of health. Publication no: 1031. Ankara: Güncel Press; 2022, p. 294–295.

Uçar EM, Gümüş D, Karabulut E, Kızıl M. 2021. Adaptation of the food neophobia scale to Turkish and determination of appropriate factor structure. Turkiye Klinikleri J Health Sci. 6(3):393–400. doi: 10.5336/healthsci.2020-76664.

World Health Organization. 2000. Obesity: preventing and managing the global epidemic. World Health Organ Technical Report Ser. 894:1–253.
Zalilah M, Khor G, Mirnalini K, et al. 2005. Food neophobia and nutritional outcomes in primary school-children. J Community Nutr. 7(3):121–129.
Zhao J, Li Z, Gao Q, Zhao H, Chen S, Huang L, Wang T. 2021. A review of statistical methods for dietary pattern analysis. Nutr J. 20(1):37. doi: 10.1186/s12937-021-00692-7.
Zysk W, Głąbska D, Guzek D. 2019. Food neophobia in celiac disease and other gluten-free diet individuals. Nutrients. 11(8):1762. doi: 10.3390/nu11081762.